



Digital Counting Scale

CS Series

Operation Manual

8526-M256-01 Rev B
07/10

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FCC COMPLIANCE STATEMENT

WARNING! This equipment generates uses and can radiate radio frequency and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area may cause interference in which case the user will be responsible to take whatever measures necessary to correct the interference.

You may find the booklet "How to Identify and Resolve Radio TV Interference Problems" prepared by the Federal Communications Commission helpful. It is available from the U.S. Government Printing Office, Washington, D.C. 20402. The stock # is 001-000-00315-4.

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INTRODUCTION

Thank you for purchasing our Detecto CS Series Digital Counting Scale. Your scale is equipped with a rechargeable battery pack that is able to provide 100 hours continuous operation (with backlight on) or 200 hours continuous operation (with backlight off).

This manual will guide you through setup and operation of your scale. Please read it thoroughly before attempting to operate this scale and keep it handy for future reference.

SPECIFICATIONS

Displays: (.75" High LCD, with backlight)	WEIGHT = 5 Digits PIECE WEIGHT = 5 Digits COUNT = 6 Digits
Dimensions:	11.75" W x 12.63" D x 4.25" H (298mm x 321mm x 108mm)
Platform Size	11.38" W x 8.25" D (289mm x 210mm)
Model: CS-6 CS-15 CS-30 CS-65	Capacity and Division Value 6 lb x .0005 lb (3 kg x .2g) 15 lb x .001 lb (7.5 kg x .5g) 30 lb x .002 lb (15 kg x 1g) 65 lb x .005 lb (30 kg x 2g)
Zero:	Established on power up routine and maintained by auto-zero circuitry
Power:	Built-in rechargeable battery pack or 115 VAC 50/60Hz or 230 VAC 50/60Hz
Tare:	100% of full scale capacity
Temperature:	32 ~ 104°F (0° ~ 40°C)
Humidity:	25% ~ 95% RH

Serial Number _____
Date of Purchase _____
Purchased Form _____

RETAIN THIS INFORMATION FOR FUTURE USE

PRECAUTIONS

Before using this scale, read this manual and pay special attention to all "WARNING" symbols:



IMPORTANT



ELECTRICAL
WARNING

INSTALLATION

Unpacking

Before beginning installation of your CS Series Digital Counting Scale, make certain the instrument has been received in good condition. Carefully remove the instrument from the shipping carton and inspect it for any evidence of damage (such as exterior dents or scratches) that may have taken place during shipment. Keep the carton and packing material for return shipment if it should become necessary. It is the responsibility of the purchaser to file all claims for any damages or loss incurred during transit.

Placement

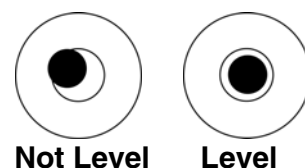
Place the scale on a stable, vibration-free level surface away from direct sunlight and from any rapidly moving air source (heating/cooling vents, fans, etc.). Make certain the power cord and peripheral cables are routed out of the way of normal traffic.



CAUTION! DO NOT place the scale on any unstable cart, stand or table. The scale may fall causing injury to the operator, and seriously damage the unit, or proper operation of the scale may be inhibited.

Level Adjustment

Check to make certain the scale is level. The level indicator is located at the front of the scale. If the scale is not level (the bubble will not be centered), loosen the locking ring on all four (4) mounting feet and adjust them as required to center the bubble and attain a level scale. Once a level condition has been obtained, lock the mounting feet in place by tightening the adjustment locking rings against the bottom of the scale.



Power Connection

The scale contains a power supply that converts the 110/120/220/240 VAC 50/60Hz wall supply to the power required by the scale circuitry. The power supply also contains the circuitry necessary to monitor and recharge the battery and is capable of operating the scale and recharging the battery simultaneously.

AC Operation

Plug the power cord into a grounded, polarized wall receptacle that supplies 110/120 VAC 50/60Hz power. *If it is necessary to use an extension cord, make certain it is a 3-wire, fully grounded type using a minimum of 18-gauge wire.* Be certain the power cord is routed out of the way of normal traffic. If only an ungrounded wall receptacle is available, **it is the customer's responsibility** to contact a qualified electrician to replace the ungrounded receptacle with a properly grounded polarized wall receptacle or have a grounding adapter properly installed.



CAUTION! To avoid electrical hazard, DO NOT under any circumstances, cut, remove, alter, or in any way bypass the power cord-grounding prong.

It is the responsibility of the customer to contact a qualified electrician to install the proper power cord connector. Plug the power cord into a grounded, polarized wall receptacle that supplies 220/240 VAC 50/60Hz power. Be certain the power cord is routed out of the way of normal traffic.

PRECAUTIONS

Most scales are designed for an office type environment. The CS Series Digital Counting Scale is no exception to that rule. The following should be used as a guideline for the proper environment to operate your scale:

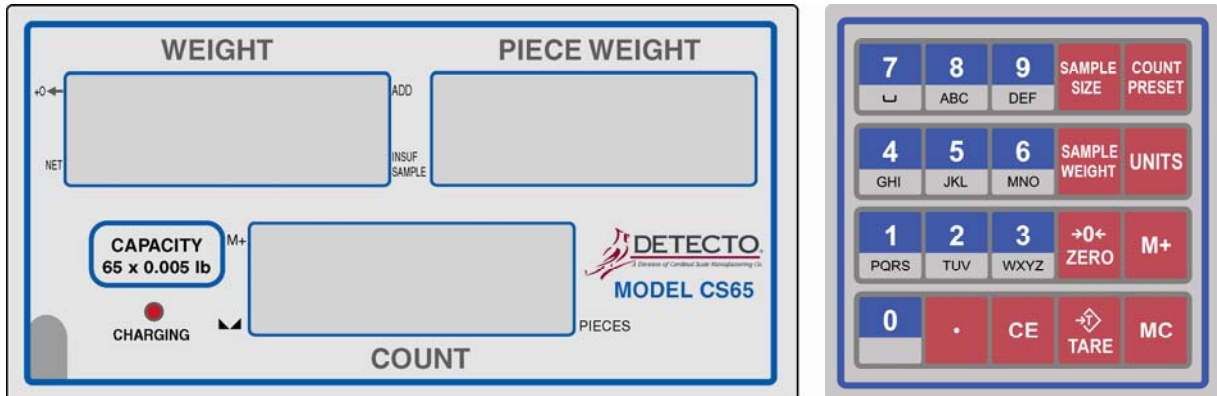
- The environment should be free of excessive dust and moisture.
- Provide a comfortable temperature. In general, the scale will perform well over a temperature range of 32 to 104° F (0 to +40° C).
- To keep cooling requirements to a minimum, the scale should be placed out of direct sunlight and to provide adequate air circulation, keep the area around the scale clear.
- Make certain the scale is not directly in front of a heating or cooling vent. Such a location will subject the scale to sudden temperature changes and air currents that may result in unstable weight readings.
- Insure that the scale has good, clean AC power and is properly grounded. In areas subject to lightning strikes, additional protection to minimize lightning damage, such as surge suppressors, should be installed.

CARE AND CLEANING

1. **DO NOT** submerge the scale in water, pour or spray water directly on it.
2. **DO NOT** use acetone, thinner or other volatile solvents for cleaning.
3. **DO** clean the indicator with a damp soft cloth and mild non-abrasive detergent.
4. **DO** remove power before cleaning with a damp cloth.
5. **DO** clean and store the scale in a plastic bag (in a dry environment) if the scale is not going to be used for some time. A desiccant packet may be included to prevent moisture build up.
6. **DO** recharge the internal battery every three months while in storage.

KEY FUNCTIONS

This section describes the use of each of the keys on the Digital Counting Scale. It will be helpful to refer to the scale keyboard or the figure below when reading this section.



The membrane keyboard is not to be operated with pointed objects (pencils, pens, fingernails, etc). Damage to keyboard resulting from this practice will **NOT** be covered under warranty.

SAMPLE SIZE This key is used to weigh a known number of pieces in preparation for a new counting operation. Sample quantities are entered using the numeric keypad in any quantity desired.

COUNT PRESET This key is used when setting the Quantity and Weight Preset limits. During a counting operation (with the limits set) if the quantity or weight exceeds the limits, the error beeper will sound and an error message will flash on the display.

SAMPLE WEIGHT Pressing this key will display the calculated average piece weight from the current sampling and counting operation. It will also allow the manual entry of a known average piece weight (using the numeric keys) to be used in the next counting operation.

UNITS Pressing this key will toggle the weighing units between pounds (lb) and kilograms (kg). **NOTE!** The currently selected weighing unit is indicated by illuminating either the lb or kg annunciator.

→0← ZERO The **ZERO** key is used to perform a variety of functions depending on the current mode of operation:

Weight Display Mode (lb or kg annunciator on): Pressing the **ZERO** key will set the weight display to zero and turn on the ZERO annunciator if the displayed weight is within $\pm 4\%$ of scale capacity.

Calibration and Operational Setup Mode: Pressing the **ZERO** key and then pressing the setup parameter number on the numeric keypad while \overline{ENTER} is displayed will enter that setup mode.

KEY FUNCTIONS, CONT.

M+

Pressing the **M+** key will cause the scale to display the contents of the accumulator (the number of pieces accumulated since the last time the accumulator was cleared).

The **M+** key is also used to add the current piece count value to the accumulator. The M+ annunciator will be selected to indicate the accumulation has taken place.



TARE

The **TARE** key is used to display the current tare weight (or zero if no tare has been entered) and/or using the numeric keypad, to enter a new tare weight. It is also used when entering a tare under a Preset number.

MC

The **MC** key is used to clear the accumulator. The M+ and ADD annunciators will turn off to indicate the clearing has taken place.

0 ~ 9

These keys are used to enter numeric data during normal operations as well as during calibration and operational setup.

A to Z
Space
(-)

These keys are used to enter the letters A to Z and Space (-) for the descriptions of ID's and Items. Up to 12 digits can be used for the description.

- This is the decimal point key. It is used to enter a decimal point where required when entering numeric data.

CE

The **CE** key is used to perform different functions depending on the current mode of operation:

- *Data Entry:* The **CE** key is used to clear an incorrect entry from the display without processing the data. If an incorrect entry is made, press the **CE** key and re-enter the correct data.
- *Count Mode:* Pressing the **CE** key while in the Count mode will finish the counting operation, update the quantity and weight accumulators and return the scale to the Weight mode.

ANNUNCIATORS

The annunciators are turned on to indicate that the scale is in the mode corresponding to the annunciator label or that the status indicated by the label is active. The following describes the functions of each annunciator.

→0← (Center-of-Zero)

The Center-of-Zero annunciator is located to the left of the WEIGHT display and is selected to indicate that the weight is within +/- 1/4 division of the center of zero.

NET

The NET annunciator is selected to show that the weight displayed is the net weight. Net weight is determined by subtracting the stored tare weight from the gross or scale weight. The tare weight, usually the weight of the container, is entered using the tare key. Note that the NET annunciator is only active when a zero tare weight or tare weight value is stored and the display is in the weight mode as shown by the illumination of the lb or kg annunciator.

ADD

The ADD annunciator is located between the WEIGHT and PIECE WEIGHT display and is selected to show that the sample is too small to calculate an accurate piece weight. Increase the sample size to turn off the ADD annunciator.

INSUF SAMPLE

The INSUF SAMPLE annunciator is located between the WEIGHT and PIECE WEIGHT display and is selected to show that the sample is too small to calculate an accurate piece weight. If the counting function is continued without increasing the sample size, the scale will still operate even though accuracy will be affected.

M+

The M+ annunciator is selected to show that the display is in the Accumulator mode and that the value displayed is the current contents of the accumulator. Individual counts are adjusted via the (M+) and (MC) keys or optionally, any count may be entered using the numeric keypad. Note that when both the M+ and ADD annunciators are selected, the current count has been added to the accumulator.

▴▴ (Stable)

The (Stable) annunciator is located to the left of the COUNT display and is selected when the WEIGHT display is stable.

PIECES

The PIECES annunciator is located on the right of the COUNT display and is selected when the unit weight of the object on the platter is less than "Minimum Unit Weight". The scale can still count the quantity even though the unit weight is too small; however, this may affect the counting accuracy.

ANNUNCIATORS, CONT.



(Low Battery)

The Low Battery annunciator will turn on to indicate that the internal battery requires charging. No change in operation will occur until just before the battery voltage drops to a level where operation is affected. At this level, the scale will automatically turn itself off.

NOTE! When the battery needs to be recharged, the CHARGING LED will turn Red. After the battery has been recharged, the CHARGING LED will turn Green.

kg

The kg annunciator is turned on to show that the weight displayed is in kilograms. The

UNITS key may be used to select kilogram as the weighing units.

lb

The lb annunciator is turned on to show that the weight displayed is in pounds. The **UNITS** key may be used to select pounds as the weighing units.

OPERATION

Power Switch

The Power Switch is located on the bottom left side panel towards the front of the scale. Place the power switch in the on position. The scale will perform a brief lamp test. This test consists of illuminating all display segments and annunciator LED's to allow the operator to make a visual verification that the display is operational. After completion of the lamp test, the scale will display the model number and software revision level, then the WEIGHT display will show zero weight, indicating the scale is ready for use.



Metric Conversion

To change weighing units, press the **UNITS** key to toggle between pounds and kilograms. Note that either the lb or kg annunciator will illuminate to indicate which weighing unit is active.



Before using the scale, it should be “warmed up” (turned on and unloaded for approximately 15 to 20 minutes).

WEIGHT Display

Displaying Weight

1. With the scale in the Weight mode (0.0000 will be displayed for WEIGHT and 0 will be displayed for the PIECE WEIGHT and COUNT displays), place the item to be weighed on the scale platform.
2. The display will show the weight on the scale platform. The lb or kg annunciators will illuminate to indicate which unit of weight has been selected and that the scale is in the Weight mode. Note that the PIECE WEIGHT and COUNT display will remain at 0 (zero).

Zero the WEIGHT Display

1. With the scale in the Weight mode (0 will be displayed for the PIECE WEIGHT and COUNT displays), press the **ZERO** key.
2. The WEIGHT display will show - - - - - (six dashes) for a few seconds and then return to 0.0000. The ZERO and Stable annunciators will illuminate, indicating a center-of-zero, stable gross weight condition.

OPERATION, CONT.

Counting

Weight of Sample is Unknown

1. With the scale in the Weight mode, place the sample on the scale platform.
2. On the numeric keypad, enter the number of pieces in the sample.
3. While the display is blinking, press the **SAMPLE SIZE** key.
4. Add the pieces to be counted and read the total count on the COUNT display.
5. Remove the pieces from the scale.
6. Press the **CE** key to complete the counting operation and return to the Weight mode.

Sample Weight is Known

1. With the scale in the Weight mode, using the numeric keypad, enter the piece weight of the sample.
2. Press the **SAMPLE WEIGHT** key.
3. Add the pieces to be counted and read the total count on the COUNT display.
4. Remove the pieces from the scale.
5. Press the **CE** key to complete the counting operation and return to the Weight mode.

Counting With an Insufficient Sample

1. With the scale in the Weight mode, place the sample on the scale platform.
2. On the numeric keypad, enter the number of pieces in the sample.
3. While the display is blinking, press the **SAMPLE SIZE** key.
4. If the sample weight is too small, the INSUF SAMPLE and ADD annunciators will be turned on and the COUNT display will show the number of pieces to be added.
5. Add the number of pieces requested. Note that if the pieces are not added the INSUF SAMPLE annunciator will stay on to show the out-of-tolerance count.
6. Add the pieces to be counted and read the count.
7. Press the **CE** key to complete the counting operation and return to the Weight mode.

OPERATION, CONT.

Tare Weight Entry

Push Button Tare

1. With the scale in the Weight mode, place the empty container on the scale platform.
2. Press the **TARE** key. The WEIGHT display will change to zero and the NET annunciator illuminates, indicating net weight is being displayed. The empty container's weight has been entered as "tare weight".

Pre-set Tare with Known Weight of Container

1. With the scale in the Weight mode, press the **TARE** key. The display will flash *P r E t R*.
2. Using the numeric keypad, enter the desired tare (container) weight.
3. After the desired tare value has been entered, press the **TARE** key. The display will show the Net weight (Gross minus tare) and the NET annunciator will illuminate.
4. Proceed with the counting or weighing operation.

Pre-set Tare with Container on Scale

1. With the scale in the Weight mode, place the container on the scale.
2. Read the weight of the container.
3. Using the numeric keypad, enter the container weight.
4. After the container weight has been entered, press the **TARE** key. The display will show the Net weight (Gross minus tare) and the NET annunciator will illuminate.
5. Proceed with the counting or weighing operation.

To Clear the Tare

To return to a zero tare, simply remove all material from the scale platform and press the **TARE** key, which will reset the tare weight to zero.

OPERATION, CONT.

Accumulator

Adding to the Weight Accumulator

1. With the scale in the Weight mode, place the item on the scale platform.
2. Press the **M+** key to add to the value of the Weight Accumulator.
3. The PIECE WEIGHT display will flash *Rdd*, then change to show the accumulator values (to indicate the addition to the accumulator has taken place). After 3 seconds, the scale will return to the weight mode.
4. Remove the item from the scale.
5. The scale is ready for the next counting or weight operation.



Additional Weight Accumulator additions cannot take place until the current weighing operation (scale weight returns to zero) has been completed. Refer to Operational Setup, M+ Key Continuous Operation (1, 5).

Displaying the Accumulator

With the scale in the Weight mode, press the **M+** key to display the content of the accumulators. The values of the accumulator will be displayed for 3 seconds, then return to the Weight mode display.

Clearing the Accumulator

Press the **MC** key. The accumulator will be reset to zero.

OPERATION, CONT.

Quantity Preset Hi Limit

The scale can store a Quantity Preset Hi Limit value. The scale will beep and the unit weight window will display a blinking **- Q t Y -** if the quantity is over the Hi limit value set.

1. Press the **COUNT PRESET** key (items can be on scale or platform can be empty).
2. The WEIGHT display will change to show dashes (- - - -).
3. Using the numeric keypad, enter the Quantity Preset Hi Limit.
4. Press the **SAMPLE SIZE** key, followed by the **COUNT PRESET** key.
5. The scale will return to the Weight mode.

Weight Preset Hi Limit

The scale can store a Weight Preset Hi Limit value. The scale will beep and the WEIGHT display will show a blinking **- L J P 5 t -** if the weight is over the Hi limit value set.

1. Press the **COUNT PRESET** key (items can be on scale or platform can be empty).
2. The WEIGHT display will change to show dashes (- - - -).
3. Using the numeric keypad, enter the Weight Preset Hi Limit.
4. Press the **SAMPLE WEIGHT** key, followed by the **COUNT PRESET** key.
5. The scale will return to the Weight mode.

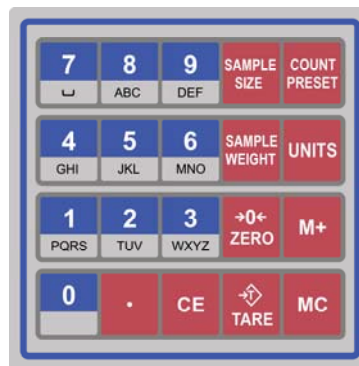
Clear the Quantity and Weight Preset Hi Limits

To clear the Quantity and/or Weight Preset Hi Limit, simply enter a "0" for the limit value.

OPERATIONAL SETUP

During the Operational Setup, it is necessary to enter values using the scales alphanumeric keypad. In addition, the following keys are also used:

KEY	FUNCTION
• (decimal)	Exit without saving setting
CE	Move the cursor left (backward)
TARE	Move the cursor right (forward)
MC	Enter (exit and save setting)



Enter Operational Setup

1. With the scale in the Weight mode (0.0000 will be displayed for WEIGHT and 0 will be displayed for the PIECE WEIGHT and COUNT displays), press the ZERO key.
2. When the WEIGHT display shows dashes (- - - -), press the • (decimal point) key.
3. The WEIGHT display will change to 0 ! F n C.
4. Press the **MC** key.
5. The WEIGHT display will change to F n C 00 (with the first 0 flashing).

F n C 0 ! – Backlight Mode

1. With the WEIGHT display showing F n C 00 (with the first 0 flashing), use the alphanumeric keypad to enter **0** and **1**.
2. The WEIGHT display will change to F n C 0 ! with the 1 flashing.
3. Press the **MC** key.
4. The PIECE WEIGHT display will change to show the current setting.
5. If the setting displayed is acceptable, press the **MC** key to save it.
6. Otherwise, using the numeric keys, enter the desired setting for the Backlight Mode and press the **MC** key to save it. Available values are 00, 01 and 02.

00 – Backlight Always On

The backlight will always be ON.

01 – Auto Backlight

While weighing, the backlight will be turned ON automatically when the weight is over 10 divisions or any key is pressed. The backlight will turn OFF automatically when the scale has not been used for 10 minutes.

02 – No Backlight

The will be no backlight (always OFF).

NOTE! The backlight mode is stored in memory and will restored when the scale is switched off and back on again.

OPERATIONAL SETUP, CONT.

***F n C 02* – Automatic Power-Off**

1. With the WEIGHT display showing *F n C 01* with the 1 flashing, press the **2** key on the alphanumeric keypad.
2. The WEIGHT display will change to *F n C 02* with the 2 flashing.
3. Press the **MC** key.
4. The PIECE WEIGHT display will change to show the current setting.
5. If the setting displayed is acceptable, press the **MC** key to save it.
6. Otherwise, using the numeric keys, enter a desired value for the scale to be automatically turned OFF when it is not in use and press the **MC** key to save it. Available values are from 1 to 10 minutes. Note that entering 00 will disable the auto power-off function.

***F n C 03* – Stable Range for Quantity Sample**

1. With the WEIGHT display showing *F n C 02* with the 2 flashing, press the **3** key on the alphanumeric keypad.
2. The WEIGHT display will change to *F n C 03* with the 3 flashing.
3. Press the **MC** key.
4. The PIECE WEIGHT display will change to show the current setting.
5. If the setting displayed is acceptable, press the **MC** key to save it.
6. Otherwise, using the numeric keys, enter a desired value for the Stable Range for Quantity Sample and press the **MC** key to save it. Available values are from 00 to 15.

NOTE! Selecting a larger number makes the sampling faster, but less accurate. Also, selecting a smaller number makes the sampling slower, but more accurate.

***F n C 04* – Automatic Average Unit Weight**

1. With the WEIGHT display showing *F n C 03* with the 3 flashing, press the **4** key on the alphanumeric keypad.
2. The WEIGHT display will change to *F n C 04* with the 4 flashing.
3. Press the **MC** key.
4. The PIECE WEIGHT display will change to show the current setting.
5. If the setting displayed is acceptable, press the **MC** key to save it.
6. Otherwise, select the desired setting for the Automatic Average Unit Weight and press the **MC** key to save it.

00 – No Automatic Average Unit Weight Function

Press the SAMPLE key for manual unit weight calibration.

01 – Automatic Average Unit Weight Function

If counting data increases over 10% compared with the previous sampling value, and the increase is less than 100% of previous sampling value, the automatic unit weight calibration will be proceed again.

OPERATIONAL SETUP, CONT.

F_{nc} 05 – A/D Sampling Speed

1. With the WEIGHT display showing *F_{nc}* 04 with the 4 flashing, press the **5** key on the alphanumeric keypad.
2. The WEIGHT display will change to *F_{nc}* 05 with the 5 flashing.
3. Press the **MC** key.
4. The PIECE WEIGHT display will change to show the current setting.
5. If the setting displayed is acceptable, press the **MC** key to save it.
6. Otherwise, select the desired setting for the A/D Sampling Speed and press the **MC** key to save it.

00 – Low Speed

Low speed is about 7.5 Hz. (Weighing reflection is slow but relatively stable).

01 – Fast Speed

Fast speed is about 14 Hz. (Weighing reflection is fast but relatively not stable).

F_{nc} 06 – Zero Display Range

1. With the WEIGHT display showing *F_{nc}* 05 with the 5 flashing, press the **6** key on the alphanumeric keypad.
2. The WEIGHT display will change to *F_{nc}* 06 with the 6 flashing.
3. Press the **MC** key.
4. The PIECE WEIGHT display will change to show the current setting.
5. If the setting displayed is acceptable, press the **MC** key to save it.
6. Otherwise, select the desired setting for the Zero Display Range and press the **MC** key to save it.

00 = Display All

01 = Zero range ± 1 bit will not display division, and displays zero instead.

02 = Zero range ± 2 bits will not display division, and displays zero instead.

03 = Zero range ± 3 bits will not display division, and displays zero instead.

If 03 is set, when setting up Pre-Tare data, the Pre-Tare data can not be less or equal to ± 3 bits external value, and so on. When the weight is over 1/3 full capacity and return to 0, this function will be started.

OPERATIONAL SETUP, CONT.

F n C 07 – Zero Tracking Range

1. With the WEIGHT display showing *F n C 06* with the 6 flashing, press the **7** key on the alphanumeric keypad.
2. The WEIGHT display will change to *F n C 07* with the 7 flashing.
3. Press the **MC** key.
4. The PIECE WEIGHT display will change to show the current setting.
5. If the setting displayed is acceptable, press the **MC** key to save it.
6. Otherwise, select the desired setting for the Zero Tracking Range and press the **MC** key to save it.

00 = After weight is stable for over 1 second, it could track $\pm 1/4d$ (external value is 1/4 bit).

01 = After weight is stable for over 1 second, it could track $\pm 1/2d$ (external value is 1/2 bit).

02 = After weight is stable for over 1 second, it could track $\pm 1d$ (external value is 1 bit).

03 = After weight is stable for over 1 second, it could track $\pm 2d$ (external value is 2 bits).

NOTE! The zero tracking function will be started only if the Gross weight is at 0.

F n C 08 – Accumulation Ending Mode

1. With the WEIGHT display showing *F n C 07* with the 7 flashing, press the **8** key on the alphanumeric keypad.
2. The WEIGHT display will change to *F n C 08* with the 8 flashing.
3. Press the **MC** key.
4. The PIECE WEIGHT display will change to show the current setting.
5. If the setting displayed is acceptable, press the **MC** key to save it.
6. Otherwise, select the desired setting for the Accumulation Ending Mode and press the **MC** key to save it.

00 = Press the **M+** key. After screen displays accumulation data for 3 seconds, the scale will return to the Weight mode.

01 = Press the **M+** key. After screen displays accumulation data, the scale will not return to the Weight mode until the **CE** key is pressed.

02 = Press the **M+** key. The screen does not display accumulation data. The beeper will “beep” once.

OPERATIONAL SETUP, CONT.

Fnc 09 – Pre-Tare Mode

1. With the WEIGHT display showing *Fnc 08* with the 8 flashing, press the **9** key on the alphanumeric keypad.
2. The WEIGHT display will change to *Fnc 09* with the 9 flashing.
3. Press the **MC** key.
4. The PIECE WEIGHT display will change to show the current setting.
5. If the setting displayed is acceptable, press the **MC** key to save it.
6. Otherwise, select the desired setting for the Pre-Tare Mode and press the **MC** key to save it.

00 = Pre-Tare can not proceed when there is weight on the platter. When there is no weight on the platter, press the **TARE** key to enter the Pre-Tare value, and then press the **TARE** key again to complete.

01 = Pre-Tare can proceed when there is weight on the platter (enter digit in the unit weight column and then press the **TARE** key).

When there is weight on the scale, enter Pre-Tare data in the unit weight column.
Example: enter “1”, “1.0”, “1.00” or “1.000” and then press the **TARE** key again to complete the Pre-Tare “1kg”.

Pre-Tare value can not be more than maximum weighing value, or the first and second segment point of division. Also, the value can not be less than or equal to the external value set up in *Fnc 05*.

Fnc 10 – Beeper Sound Output Condition Under Quantity Mode

1. With the WEIGHT display showing *Fnc 09* with the 9 flashing, press the **0** key, the **CE** key and then the **1** key on the alphanumeric keypad.
2. The WEIGHT display will change to *Fnc 10* with the 0 flashing.
3. Press the **MC** key.
4. The PIECE WEIGHT display will change to show the current setting.
5. If the setting displayed is acceptable, press the **MC** key to save it.
6. Otherwise, select the desired setting for the Beeper Sound Output Condition Under Quantity Mode and press the **MC** key to save it.

00 = If the weighing quantity exceeds quantity setting (or weight exceeds weight setting), the beeper will sound when the weight is unstable.

01 = If the weighing quantity exceeds quantity setting (or weight exceeds weight setting), and it doesn't matter if the weight is stable, the beeper will sound automatically.

OPERATIONAL SETUP, CONT.

$F_nC \quad 11$ – Accumulation Acceptable Condition 1

1. With the WEIGHT display showing $F_nC \quad 10$ with the 0 flashing, press the **1** key on the alphanumeric keypad.
2. The WEIGHT display will change to $F_nC \quad 11$ with the right 1 flashing.
3. Press the **MC** key.
4. The PIECE WEIGHT display will change to show the current setting.
5. If the setting displayed is acceptable, press the **MC** key to save it.
6. Otherwise, select the desired setting for the Accumulation Acceptable Condition 1 setting and press the **MC** key to save it.

00 = The scale will accept accumulation only when the weight is stable.

01 = The scale will accept accumulation no matter if the weight is stable or not.

$F_nC \quad 12$ – Accumulation Acceptable Condition 2

1. With the WEIGHT display showing $F_nC \quad 11$ with the second 1 flashing, press the **2** key on the alphanumeric keypad.
2. The WEIGHT display will change to $F_nC \quad 12$ with the 2 flashing.
3. Press the **MC** key.
4. The PIECE WEIGHT display will change to show the current setting.
5. If the setting displayed is acceptable, press the **MC** key to save it.
6. Otherwise, select the desired setting for the Accumulation Acceptable Condition 2 setting and press the **MC** key to save it.

00 = The scale will only accept the next accumulation data when the weight returns to zero.

01 = The scale will accept the next accumulation data no matter if the weight returns to zero or not. When there is a load on the scale, the weight can be accumulated continuously.

02 = The weight must return to zero Gross weight before the scale can accept the next accumulation data.

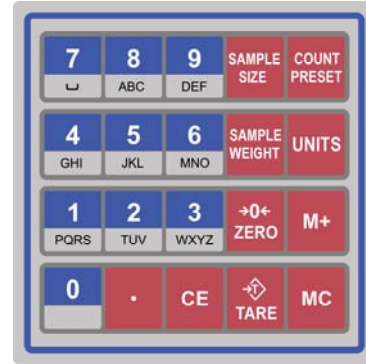
Operational Setup is Complete

1. With the WEIGHT display showing $F_nC \quad 12$ with the 2 flashing, press the **•** (decimal point) key.
2. The WEIGHT display will change to $01 \quad F_nC$.
3. Press the **•** (decimal point) key again.
4. The scale will return to the Weight mode (0.0000 will be displayed for WEIGHT and 0 will be displayed for the PIECE WEIGHT and COUNT displays).
5. The scale is ready for normal use.

CALIBRATION

During the Calibration process, it is necessary to enter values using the scales alphanumeric keypad. In addition, the following keys are also used:

KEY	FUNCTION
• (decimal)	Exit without saving setting
CE	Move the cursor left (backward)
TARE	Move the cursor right (forward)
MC	Enter (exit and save setting)



Enter Calibration

1. With the scale in the Weight mode (0.0000 will be displayed for WEIGHT and 0 will be displayed for the PIECE WEIGHT and COUNT displays), press the ZERO key.
2. When the WEIGHT display shows dashes (-----), press the • (decimal point) key.
3. The WEIGHT display will change to 0.1 F n L. Press the **TARE** key.
4. The WEIGHT display will change to 0.2 E L. Press the **MC** key.
5. The WEIGHT display will change to E L 0.0 (with the first 0 flashing).
6. Use the alphanumeric keypad to enter **0** and **1**. The WEIGHT display will change to E L 0.1 with the 1 flashing.
7. Press the **MC** key. The WEIGHT display will change to show 0.0000 and the COUNT display will show the zero weight count.
8. Make sure that there is no load on the platter and press the **MC** key.
9. Both the WEIGHT and COUNT display will change to dashes (-----). After a few seconds, the COUNT display will return to the zero weight count and the WEIGHT display will prompt for the weight to be used for calibration. EXAMPLE: For a CS30 the WEIGHT display will flash 30.0000 lb.

NOTE! To calibrate the scale with a different weight value than the prompted amount, use the alphanumeric keypad to enter the new weight value. EXAMPLE: To calibrate a CS30 with 10 lbs instead of 30 lbs, enter 1,0,0,0,0. Note that the new value can not exceed the capacity of the scale.

10. Place the test weight on the scale platter. The WEIGHT display will change to the value of the test weight and the COUNT display will show the equivalent weight count.
11. Wait a few seconds for the platter to stabilize and press the **MC** key.
12. Both the WEIGHT and COUNT displays will change to dashes (-----) for a few seconds and then the WEIGHT display will change to E L 0.1 with the 1 flashing.
13. Remove the test weights from the scale platter and press the • (decimal point) key.
14. The WEIGHT display will change to 0.2 E L. Press the • (decimal point) key again.
15. The scale will return to the Weight mode (0.0000 will be displayed for WEIGHT and 0 will be displayed for the PIECE WEIGHT and COUNT displays).
16. The scale is ready for normal use.

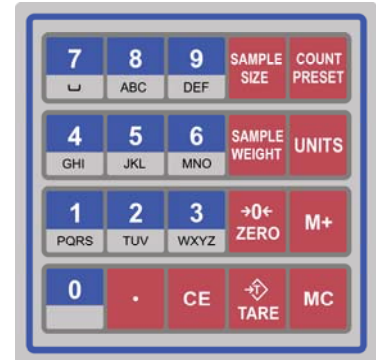
GRAVITY ADJUSTMENT



IMPORTANT! This scale is equipped with a Gravity Adjustment function which allows the scale to be calibrated in one location and then adjusted to match the gravity at the location where it will be used.

During the Gravity Adjustment process, it is necessary to enter values using the scales alphanumeric keypad. In addition, the following keys are also used:

KEY	FUNCTION
• (decimal)	Exit without saving setting
CE	Move the cursor left (backward)
TARE	Move the cursor right (forward)
MC	Enter (exit and save setting)



Enter Gravity Adjustment

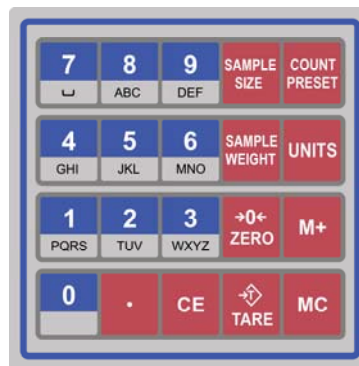
1. With the scale in the Weight mode (0.0000 will be displayed for WEIGHT and 0 will be displayed for the PIECE WEIGHT and COUNT displays), press the ZERO key.
2. When the WEIGHT display shows dashes (- - - -), press the • (decimal point) key.
3. The WEIGHT display will change to 0.1 F n L. Press the **TARE** key.
4. The WEIGHT display will change to 0.2 E L. Press the **MC** key.
5. The WEIGHT display will change to E L 00 (with the first 0 flashing).
6. Use the alphanumeric keypad to enter **0** and **2**.
7. The WEIGHT display will change to E L 02 with the 2 flashing.
8. Press the **MC** key.
9. The PIECE WEIGHT display will change to show the current number of times the gravity adjustment has been changed and the COUNT display will show the current gravity adjustment value.
10. Press the **MC** key.
11. The first digit on the COUNT display will start to flash.
12. Use the alphanumeric keypad to enter the new gravity adjustment value.
13. Press the **MC** key.
14. The WEIGHT display will change to 0.2 E L.
15. Press the • (decimal point) key.
16. The scale will return to the Weight mode (0.0000 will be displayed for WEIGHT and 0 will be displayed for the PIECE WEIGHT and COUNT displays).
17. The scale is ready for normal use.

NOTE! By default, the USA gravity adjustment value will be used. Consult the factory Tech Support for the gravity adjustment value for your location.

RS232 AND SERIAL PRINTER SETUP

During the RS232 and Serial Printer Setup, it is necessary to enter values using the scales alphanumeric keypad. In addition, the following keys are also used:

KEY	FUNCTION
• (decimal)	Exit without saving setting
CE	Move the cursor left (backward)
TARE	Move the cursor right (forward)
MC	Enter (exit and save setting)



Enter RS232 and Serial Printer Setup

1. With the scale in the Weight mode (0.000 will be displayed for WEIGHT and 0 will be displayed for the PIECE WEIGHT and COUNT displays), press the ZERO key.
2. When the WEIGHT display shows dashes (- - - -), press the • (decimal point) key.
3. The WEIGHT display will change to 0.1 F n L. Press the **TARE** key.
4. The WEIGHT display will change to 0.2 E L. Press the **TARE** key again.
5. The WEIGHT display will change to 0.3 r 5 l. Press the **MC** key.
6. The WEIGHT display will change to r 5 l 00 (with the first 0 flashing).

r 5 l 00 – Baud Rate Setting

1. With the WEIGHT display showing r 5 l 00 (with the first 0 flashing), use the alphanumeric keypad to enter 0 and 1.
2. The WEIGHT display will change to r 5 l 01 with the 1 flashing.
3. Press the **MC** key.
4. The PIECE WEIGHT display will change to show the current setting.
5. If the setting displayed is acceptable, press the **MC** key to save it.
6. Otherwise, using the numeric keys, enter the desired setting for the Baud Rate and press the **MC** key to save it. Available values are 00 through 05.

00	=	600 bits/second
01	=	1200 bits/second
02	=	2400 bits/second
03	=	4800 bits/second
04	=	9600 bits/second
05	=	19200 bits/second

RS232 AND SERIAL PRINTER SETUP, CONT.

r 5 ! 02 – Communication Protocol Setting

1. With the WEIGHT display showing r 5 ! 01 (with the 1 flashing), use the alphanumeric keypad to enter **0** and **2**.
2. The WEIGHT display will change to r 5 ! 02 with the 2 flashing.
3. Press the **MC** key.
4. The PIECE WEIGHT display will change to show the current setting.
5. If the setting displayed is acceptable, press the **MC** key to save it.
6. Otherwise, using the numeric keys, enter the desired setting for the Communication Protocol and press the **MC** key to save it. Available values are 00 through 02.

00 = N, 8, 1

01 = E, 7, 1

02 = O, 7, 1

r 5 ! 03 – Output Data Format Setting

1. With the WEIGHT display showing r 5 ! 02 (with the 2 flashing), use the alphanumeric keypad to enter **0** and **3**.
2. The WEIGHT display will change to r 5 ! 03 with the 3 flashing.
3. Press the **MC** key.
4. The PIECE WEIGHT display will change to show the current setting.
5. If the setting displayed is acceptable, press the **MC** key to save it.
6. Otherwise, using the numeric keys, enter the desired setting for the Output Data Format and press the **MC** key to save it. Available values are 00 through 07.

00 = Fixed format 1 (details on the next page)

01 = Fixed format 2 (details on the next page)

02 = Reserved

03 = Same as screen display (general format)

03 = Same as screen display (simple format)

05 = Gross weight (general format)

06 = Net weight (general format)

07 = Tare (general format)

RS232 AND SERIAL PRINTER SETUP, CONT.

Example: Illustration for fixed format is described as follows:

Fixed format 1

"Press M+ key to transmit"

NO.	3	
G	2.480	kg
N	2.000	kg
T	0.080	kg
PT	0.400	kg
U/W	1.6003	g
Q	1250	pcs

Fixed format 2

"Press M+ key to transmit"

ID:	xxxxxxx	xxxxx
ITEM:	xxxxxxx	xxxxx
NO.	3	
G	2.480	kg
N	2.000	kg
T	0.080	kg
PT	0.400	kg
U/W	1.6003	g
Q	1250	pcs

Fixed format 1,2

"Press MC key to transmit"

(to print out total accumulation data, and clear data in memory)

=====

T/N	3	
T/W	1500	kg
T/Q	300	pcs

NO.	⇒ Number of Counts
Q	⇒ Quantity
T	⇒ Tare
PT	⇒ Pre-Tare
G	⇒ Gross Weight
N	⇒ Net weight
U/W	⇒ Unit weight
T/N	⇒ Total Number of Counts
T/W	⇒ Total weight
T/Q	⇒ Total quantity
ID:	12 digits (max.)
ITEM:	12 digits (max.)

RS232 AND SERIAL PRINTER SETUP, CONT.

r 5 ! 04 – Output Counts Setting per Second in Continuous Transmission

1. With the WEIGHT display showing r 5 ! 03 (with the 3 flashing), use the alphanumeric keypad to enter **0** and **4**.
2. The WEIGHT display will change to r 5 ! 04 with the 4 flashing.
3. Press the **MC** key.
4. The PIECE WEIGHT display will change to show the current setting.
5. If the setting displayed is acceptable, press the **MC** key to save it.
6. Otherwise, using the numeric keys, enter the desired setting for the Output Counts per Second in Continuous Transmission and press the **MC** key to save it. Available values are 00 through 04.

00	=	1 count/second
01	=	2 counts/second
02	=	4 counts/second
03	=	8 counts/second
04	=	More than 8 counts/second



- If r 5 ! 03 is set as 00 (fixed format 1) or 01 (fixed format 2), the continuous transmission mode may only work with short distances.
- If r 5 ! 03 is set as 02 (Reserved), continuous transmission mode is not available.
- If r 5 ! 03 is set as 03 through 04, continuous transmission mode is available.

RS232 AND SERIAL PRINTER SETUP, CONT.

r 5 / 05 – Operation Mode Setting

1. With the WEIGHT display showing r 5 / 04 (with the 4 flashing), use the alphanumeric keypad to enter **0** and **5**.
2. The WEIGHT display will change to r 5 / 05 with the 5 flashing.
3. Press the **MC** key.
4. The PIECE WEIGHT display will change to show the current setting.
5. If the setting displayed is acceptable, press the **MC** key to save it.
6. Otherwise, using the numeric keys, enter the desired setting for the Operation Mode and press the **MC** key to save it. Available values are 00 through 04.

00 = Command mode

01 = Continuous transmission and command mode

02 = Automatic transmission and command mode

03 = Manual transmission and command mode
Press **M+** or **MC** key to do manual transmission.

04 = No RS-232 transmission



- If r 5 / 03 is set as 02 (Reserved), the setting of c r 5 / 05 will be fixed as manual transmission but without command mode.
- For an illustration of command mode format, refer to “Appendix 1”.

r 5 / 06 – Continuous Transmission Output Condition Setting

1. With the WEIGHT display showing r 5 / 05 (with the 5 flashing), use the alphanumeric keypad to enter **0** and **6**.
2. The WEIGHT display will change to r 5 / 06 with the 6 flashing.
3. Press the **MC** key.
4. The PIECE WEIGHT display will change to show the current setting.
5. If the setting displayed is acceptable, press the **MC** key to save it.
6. Otherwise, using the numeric keys, enter the desired setting for the Continuous Transmission Output Condition and press the **MC** key to save it. Available values are 00 or 01.

00 = Output all

01 = No output under OL or unstable condition



- The r 5 / 06 setting will only be effective when r 5 / 05 is set as 01 “continuous transmission mode”.

RS232 AND SERIAL PRINTER SETUP, CONT.

r 5 ! 07 – Zero Reset Condition for Automatic Transmission Setting

1. With the WEIGHT display showing r 5 ! 06 (with the 6 flashing), use the alphanumeric keypad to enter **0** and **7**.
2. The WEIGHT display will change to r 5 ! 07 with the 7 flashing.
3. Press the **MC** key.
4. The PIECE WEIGHT display will change to show the current setting.
5. If the setting displayed is acceptable, press the **MC** key to save it.
6. Otherwise, using the numeric keys, enter the desired setting for the Zero Reset Condition for Automatic Transmission Condition and press the **MC** key to save it. Available values are 00 through 02.

00 = External value "0d"

01 = External value "0d"

02 = External value "0d"



- The range setting of r 5 ! 07 is related to the zero reset setting in accumulation acceptable condition in F n C 12.
- Only if the r 5 ! 05 setting is set as 02 will r 5 ! 07 setting be effective.

r 5 ! 08 – Reset Condition for Automatic Transmission Setting

1. With the WEIGHT display showing r 5 ! 07 (with the 7 flashing), use the alphanumeric keypad to enter **0** and **8**.
2. The WEIGHT display will change to r 5 ! 08 with the 8 flashing.
3. Press the **MC** key.
4. The PIECE WEIGHT display will change to show the current setting.
5. If the setting displayed is acceptable, press the **MC** key to save it.
6. Otherwise, using the numeric keys, enter the desired setting for the Zero Reset Condition for Automatic Transmission Condition and press the **MC** key to save it. Available values are 00 through 02.

00 = External value "0d"

01 = External value "0d"


02 = External value "0d"



- Only if r 5 ! 05 setting is set as 02 "automatic transmission mode" will r 5 ! 08 setting be effective

ERROR AND STATUS DISPLAYS

The Digital Counting Scale is equipped with a diagnostic software program that tests various portions of the instrument's circuitry and verifies proper operation. Should a problem be detected, an error or status message will be displayed alerting the operator to that condition. The following lists these errors and status displays and their meaning:

Display	Meaning
- QTY -	QtY – During a counting operation, this message is flashed to indicate the quantity of items on the scale exceeds the Quantity Preset Hi Limit value. The error beeper will also sound on and off.
- LJPSt -	WPSt – During a counting operation, this message is flashed to indicate the weight of items on the scale exceeds the Weight Preset Hi Limit value. The error beeper will also sound on and off.
◀	Left Arrow - This symbol is used by the scale to indicate which annunciator is active. Note that this applies to the annunciator labels on the display overlay.
- - OL -	Over Load - Indicates the scale weight capacity has been exceeded. The error beeper will also sound on and off until the Over Load condition is corrected.
SAMP	SAMP - Indicates the scale is weighing the sample.
	Low Battery - Indicates the internal battery requires charging.

BEFORE YOU CALL FOR SERVICE

The Digital Counting Scale has been designed to provide you with years of trouble-free operation. In spite of this, troubles sometimes happen. Before calling for service assistance you should make some initial checks to verify that a problem does exist. The following describes several types of symptoms along with suggested remedies.

Problem	Possible Solutions
Display does not turn on	<p>AC Operation: Is the AC power cord fully inserted into the wall receptacle? Check wall receptacle for proper AC power. Try another electrical appliance in the same receptacle, does it work? Check the circuit breaker. Has there been power failure.</p> <p>Battery operation: Check if battery is installed and installed correctly. Is battery discharged? Recharge or replace battery.</p>
Incorrect weight displayed	Insure that the scale platform isn't touching an adjacent object. Have proper operation procedures been followed?

APPENDIX 1 – RS-232 FULL DUPLEX FORMAT

Table 1. Command Format Illustration

Command Format A

Host	Command		
Slave		Command	
MZ	Return to zero	CP	Clear off pre-tare value
MT	Tare	CT	Clear off tare value
AT	Current net weight accumulation & count plus 1	DT	Clear off accumulated data and counts
SC	Set continuous transmission mode	SA	Set automatic transmission mode.
SM	Set manual transmission mode	SO	Set command mode
UA	Shift to first unit	UB	Shift to second unit
%	Cease continuous transmission mode and enter into command mode		

Command Format B

Host	Command		
Slave		Data	
RW	Read current displaying weight	RB	Read current displaying weight(simple)
RG	Read gross weight	RT	Read tare
RN	Read net weight	RI	Read net weight (simple)
RH	Read gross weight (simple)	RE	Read pre-tare (simple)
RU	Read unit weight (simple)	RD	Read accumulated quantity (simple)
RC	Read accumulated counts (simple)	RI	Read tare (simple)
Rf	Read pre-set name (ITEM)	Rk	Read accumulated weight (simple accumulation format)
Rg	Read ID#	Rh	Read weighing unit
RQ	Read quantity (simple)	Ri	Read unit weight unit
Re	Read PLU#		

Note : Add % before italic and magnified letter to read continuously.

Add # before italic and magnified letter to read stable value only.

- Three formats (ABC) mentioned above are all RS-232 full duplex. If the slave terminal receives the below-listed messages, it represents Error condition.
 - E1: Wrong command
 - E2: Wrong format (wrong parameter)
 - E3: Mismatch proceeding condition

APPENDIX 1 – RS-232 FULL DUPLEX FORMAT, CONT.

Table 2. Output Format Illustration

General Format

Gross weight	S	T	,	G	S	,	+	1	.	2	3	.	4	5	6	I	b	o	z	CR	LF
Net weight	S	T	,	N	T	,	+	1	2	.	3	4	.	5	6	T	I	.	g		
Tare	S	T	,	T	R	,	+	0	1	2	.	3	4	5	6	SP	SP	k	g		
+ overload	O	L	,	G	S	,	+	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP		
- overload	O	L	,	G	S	,	-	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP		
Unstable	U	S	,	G	S	,	+	0	1	2	3	.	4	5	6	SP	SP	I	b		

Totally 21 bytes (including CR LF)

Simple Format (price computing & counting)

ID#	0	0	0	0	0	0	0	0	0	0	0	2	CR	LF
Read preset name	SP	SP	SP	SP	SP	SP	SP	A	P	P	L	E		

Totally 14 bytes (including CR LF)

Simple Format

Read current weighing unit	0	CR	LF
Read current price computing unit	1		
Read current unit weight unit	2		

Totally 3 bytes (Including CR LF)

Simple Format (price computing & counting & weighing)

Gross weight	+	1	.	2	3	.	4	5	6	CR	LF
Net weight	+	1	2	.	3	4	.	5	6		
Tare	+	0	1	2	.	3	4	5	6		
Pre-tare	+	0	1	2	.	3	4	5	6		
+ overload	+	SP	SP	SP	SP	SP	SP	SP	SP		
- overload	-	SP	SP	SP	SP	SP	SP	SP	SP		
Unstable	+	0	1	2	3	.	4	5	6		
Quantity	0	1	2	3	4	5	6	7	8		
Unit weight	0	1	2	3	.	4	5	6	7		
Accumulated counts	0	0	0	0	0	0	0	0	1		
Accumulated quantity	0	0	0	0	0	0	0	0	2		
PLU#	0	0	0	0	0	0	0	1	2		

Totally 11 bytes (including CR LF)

Simple Accumulation Format

Accumulated weight	+	0	1	2	3	4	.	5	6	.	7	CR	LF
Accumulated quantity	+	0	1	2	3	4	5	6	7	8	9		
Accumulated weight + overflow	+	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP		
Accumulated weight - overflow	+	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP		

Totally 13 bytes (including CR LF)

APPENDIX 2 – FIXED FORMAT RS-232 TRANSMISSION LINE ILLUSTRATION

SCALE \longrightarrow **RS-232 PRINTER**

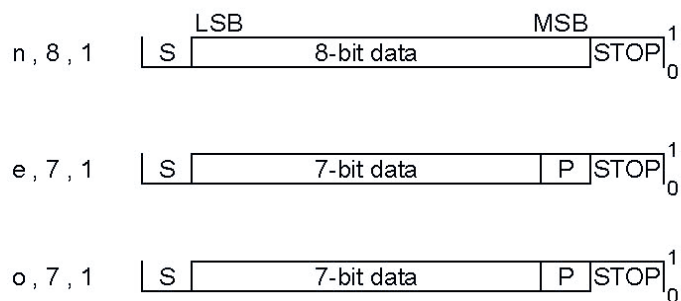
DB 25 (Male)		DB9 (Male)
3 TXD	→	RXD 2
2 RXD	→	TXD 3
7 GND	→	GND 5

DB 25 (Male)		DB9 (Male)
3 TXD	→	RXD 2
2 RXD	→	TXD 3
7 GND	→	GND 7

SCALE \longrightarrow **PC**

DB25(Male)		DB9(Female)
3 TXD	→	RXD 3
2 RXD	→	TXD 2
7 GND	→	GND 5
DB25(Male)		DB25(Female)
3 TXD	→	RXD 3
2 RXD	→	TXD 2
7 GND	→	GND 7

Serial Data Transfer/Receive Format



































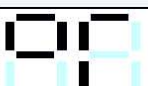



- S : Start bit
- STOP: Stop bit
- P : Parity bit

APPENDIX 3 – ASCII CODE TABLE

Symbol	ASCII Code	Symbol	ASCII Code	Symbol	ASCII Code
A	41H	a	61H	0	30H
B	42H	b	62H	1	31H
C	43H	c	63H	2	32H
D	44H	d	64H	3	33H
E	45H	e	65H	4	34H
F	46H	f	66H	5	35H
G	47H	g	67H	6	36H
H	48H	h	68H	7	37H
I	49H	i	69H	8	38H
J	4AH	j	6AH	9	39H
K	4BH	k	6BH	↵	0DH
L	4CH	l	6CH		
M	4DH	m	6DH		
N	4EH	n	6EH		
O	4FH	o	6FH		
P	50H	p	70H		
Q	51H	q	71H		
R	52H	r	72H		
S	53H	s	73H		
T	54H	t	74H		
U	55H	u	75H		
V	56H	v	76H		
W	57H	w	77H		
X	58H	x	78H		
Y	59H	y	79H		
Z	5AH	z	7AH		

APPENDIX 4 – 7-SEGMENT DISPLAY CHARACTERS

Number	Display	Letter	Display	Letter	Display
0		A		N	
1		B		O	
2		C		P	
3		D		Q	
4		E		R	
5		F		S	
6		G		T	
7		H		U	
8		I		V	
9		J		W	
		K		X	
		L		Y	
°C		M		Z	